

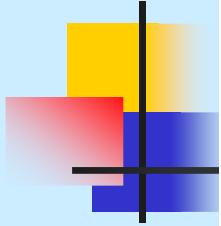
Biotechnology in Lithuania

Brief introduction to business, research
and studies



prof. Kęstutis Sasnauskas

Institute of Biotechnology



**BIOTECHNOLOGY
IN
LITHUANIA
2008
BUSINESS & RESEARCH**



**LITHUANIAN BIOTECHNOLOGY ASSOCIATION
VILNIUS**



President of Lithuanian Biotechnology
Association A.A. Pauliukonis



Brief history of modern biotechnology in Lithuania

- 1961 – The programme of the biochemistry studies at Vilnius University
- 1962 – The department of Biochemistry at Vilnius University
- 1967 – Institute of Biochemistry
- 1975 – Institute of Applied Enzymology (IAE)

R&D of classical fermentation and purification technologies for enzyme production

- 1977 – Laboratory of Genetic Engineering IAE (Headed by prof. A.Janulaitis)
- 1978 – Department of Molecular Biology

The principal supplier of restriction endonucleases for genetic engineering in the USSR

- 1983 - Marketing of restriction endonucleases in Japan



Brief history of modern biotechnology in Lithuania

- 1984 – Laboratory of Genetic Engineering Materials (Headed by Prof. V.Bumelis)
- 1988 – Division of Recombinant Pharmaceuticals in IAE
Development of the first technologies in the USSR for the production of human recombinant proteins for medicine
- 1989 – Registration of **Reaferon**
Recombinant human interferon- α 2b dosage form
- 1990/91 – Lithuanian independence. State Research Institute – **Institute of Biotechnology (IBT)**
- 1993/94 – Four spin-off's (formed on the basis of production branches), separated & privatized mainly by employees of these Co.



Brief history of modern biotechnology in Lithuania

- 1994 - The four spin-off companies separated from **Institute of Biotechnology**:
 - JSC **Fermentas**
 - JSC **Sicor Biotech**
 - JSC **Biocentras**
 - JSC **Biok** – enzyme containing cosmetics

*Nowadays, the first three companies are the leaders of
Lithuanian modern biotechnological industry*

JSC Fermentas

1995 – the year of establishment



JSC Fermentas

	2007	2006
Employees	307	250
R&D employees	67	29
R&D spend, €M	1.82	0.929
Revenue, €M	17.9	14.7
Export, %	99.4	99.3

Products:

More than 700 molecular biology products, including:

- Restriction enzymes.
- DNA/RNA modifying enzymes.
- PCR-related products.
- Ladders/markers for DNA, RNA and protein analysis.
- Various molecular biology kits.
- Nucleotides.



JSC Sicor Biotech

1995 – the year of establishment (*AB Biofa*)



JSC Sicor Biotech

	2007	2006
Employees	140	141
R&D employees	35	35
R&D spend, €M	4.3	4.4
Revenue, €M	11.8	10.5
Export, %	68	78

Products:

SICOR Biotech UAB manufactures high quality recombinant biopharmaceutical substances and dosage forms:

- Interferon alfa-2b Human Recombinant: *Realdiron®*, *Realdiron Set®*.
- Recombinant Human Growth Hormone: *Biosoma®*.
- Filgrastim (r-MetHuG-CSF, granulocyte-colony stimulating factor): *Grasalva™*.



JSC Biocentras



1988 – the year of establishment

	2007	2006
Employees	32	28
R&D employees	13	11
R&D spend, €M	0.250	0.253
Revenue, €M	0.50	1.02

Products: Microbial compositions and sorbents for decontamination of environment.

Services:

- Decontamination of environment polluted by oil, oil products, fatty wastes and the liquidation of the consequences of accidental spillages of oil.
- Design and construction of environment protection plants, professional consultations on environment protection.
- Search of microbial pharmaceutical substances, development of fermentation and purification processes.

JSC Biopolis



1994 – the year of establishment

	2007	2006
Employees	8	8
Revenue, € M	2,0	1,6

The main supplier of industrial enzymes for Lithuania

Export to Latvia, Estonia, Kazakhstan

Trade in flavours for foodstuffs, fodder vitamins,
biological insecticides, pheromones

Consultations on enzyme applications for bread, beer,
and alcohol industry, detergents and textile

JSC Sorpo

2000 – the year of establishment

	2007	2006
Employees	35	26
Revenue, € M	0,7	0,4

Products: Kits of reagents designed to detect pathogenic microorganisms.

Sorpo kits are complete systems which provide reagents for the whole diagnostic process, starting with nucleic acid extraction from clinical specimens, followed by PCR (polymerase chain reaction) amplification and leading to interpretation of results and pathogen detection:

Services: Diagnostic services of major pathologies based on the use of modern molecular biology techniques (PCR, Real-Time PCR, etc.):

JSC Biotechpharma

2004 – the year of establishment

Products:

Biotechpharma develops in-house biopharmaceutical products based on recombinant protein technologies. Company pipeline consists of therapeutic proteins in early-development stage.

Services:

- Contract biopharmaceutical R&D services. Company focuses on its core competences in expression systems design, substance biopharmaceutical process development, substance characterization, development of analytical procedures, aimed to produce cost-efficient, scalable and cGMP-compliant production technologies.
- Quick and reliable proteomic services.



JSC Imunolita

2006 – the year of establishment

	2007	2006
Employees	11	8
R&D employees	8	6
R&D spend, €M	0.364	0.196
Revenue, €M	?	?



Services: Imunolita was founded as private Unobligated Cord Blood Bank. We strive to set the industrial standards for collection, processing and long-term storage of child's stem cells.

The purpose of the company is the creation and development of cellular technologies and their implementation in the field of practical medicine. The company specializes in personalized therapy where the patient is treated with an individually tailored technology product and patient's own blood, stem or immune system cells are generally used.

JSC Profarma



2007 – the year of establishment

Services:

- Gene cloning, subcloning, mutagenesis.
- Custom bacterial or yeast strain generation.
- Protein expression and production.
- Protein purification.
- Up-stream and down-stream process development in compliance with current regulatory requirements.
- Substance characterization and analytical control, biological qualification.
- Specialized services – custom cell-based assays, custom antibodies.

JSC Grida Group

1992 – the year of establishment

Services:

The best supplier of equipment and materials for Lithuanian biotech, medical, chemical, agro- and related laboratories and manufacturers. The company provides equipment, reagents, laboratory materials, diagnostic testing systems, disposable systems to laboratories of universities, research institutes, medical clinics, quality control laboratories, manufacturing companies, etc. *Grida LAB* sells wide range of products, from simple goods for daily work to complex equipment. Prerequisite of successful business – trade in exclusively supreme quality products. Long-standing working experience enables us to provide methodological consulting services to our customers. The Technical Department provides maintenance services, translates and adapts equipment user manuals, installs the equipment and conducts metrological certification. Company's engineers have received training in equipment manufacturing sites, therefore they can provide services of high professional standard.



JSC Biotecha

1996 – the year of establishment

Services:

The most important supplier of equipment, materials and process systems for Lithuanian biotech, pharmaceutical, medical, food & beverages, chemical industries and laboratories:



Biofuels

2004 – Industrial production of biodiesel and bioethanol started in Lithuania

The main factories in function at the present time :

- **JSC Future** – *40,000 t/y of bioethanol*
- **JSC Rapsoila** – *30,000 t/y of biodiesel*
- **JSC Mestilla** – *100,000 t/y of biodiesel*

Total production of biofuels in 2007 : 90,000 tons

~ 6 % from *present liquid fuel consumption in Lithuania*

~ 350 mln. LT = 100 mln. €



Lithuanian National Biotechnology Platform (LNBP)

**The LNBP was established in July 2006
and represents 28 partners:**

- **13 academic partners**
- **15 industrial partners**



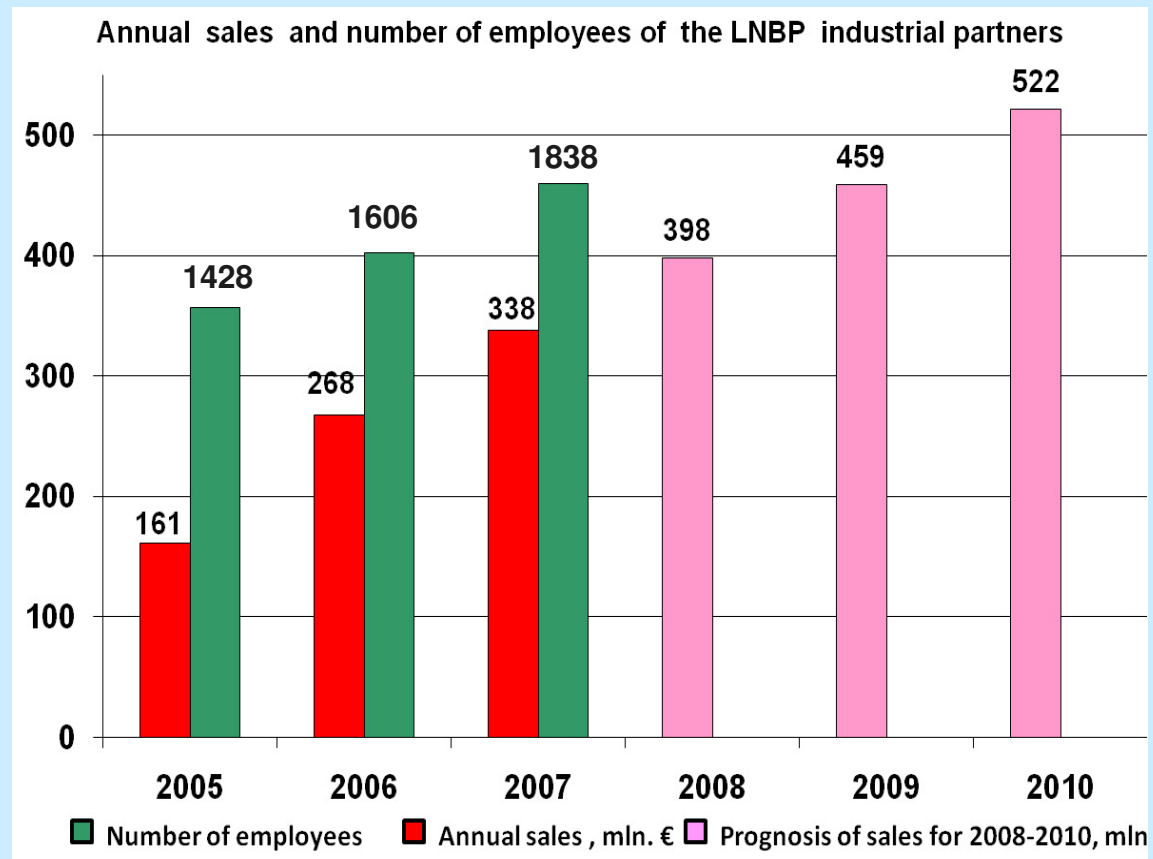
Lithuanian National Biotechnology Platform (LNBP)

The LNBP distinguishes two main priority areas:

1. Industrial biotechnology and agro-biotechnology. The objectives in this area are to reduce the dependence of Lithuania upon the imports of non-renewable raw materials via a more efficient utilization of the available agricultural and forestry resources, reduction of environmental pollution and the “green-house” effect, and the expansion of the share of modern technologies in the Lithuanian economy.

2. Pharmaceutical biotechnology, products for molecular biology and diagnostics. This area of activity covers the development of production and practical application of the most modern medicaments and diagnostic tools.

The LNBP partners – fast growing sector of industry



*The annual growth of sales in 2006 and 2007 equals 40 %
(10 % for all Lithuanian industry)*



Science

- Lithuanian High Tech programme
- 2003 - 2013

- Lithuanian Industrial Biotech programme,
2007 – 2010



High Tech programme 2003-2006 and 2007-2013

- Biotechnology and biomedicine
2008 – 1.0 mln. €
- Mechatronics
- Laser technology
- Info technology
- Nanotechnology



Lithuanian Industrial Biotechnology programme 2007-2010 (Prof. G.Dienys)

The programme started in July 2007

Budget is financed by State, 8.7 mln.€ for all period:

2007 – 1.2 mln. €

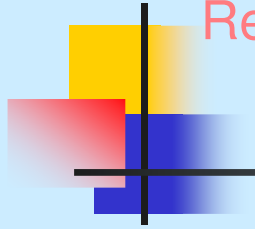
2008 – 1.7 mln. €

Topics of investigations:

- Products from biomass (biofuels, biopolymers)
- Pharmaceuticals, diagnostic tools and methods
- Biocatalysts and biotechnological processes
- Feedstock for industrial biotechnology

Science & studies

Research institutes and universities involved in biotechnological R&D
in Lithuania



Institute of Biotechnology

Institute of Biochemistry

Institute of Horticulture

Institute of Immunology

Institute of Oncology

Institute of Agriculture

Forest Institute

Institute of Botany

Vilnius University

Faculty of Chemistry

Faculty of Life Science

Vilnius Gediminas Technical University

Dept. Chem. And Bioeng.

Kaunas University of Technology

Faculty of Chem. Technology

Dept. of Process

Control

Dept. of Organic

Technology

Vytautas Magnus University

Faculty of Natural Sciences

Lithuanian University of Agriculture

Institute of Environment



For details:



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Institute of Biotechnology

EU “ Biotechnology Centre of Excellence



www.ibt.it



Staff of the Institute - 2007

- Staff of the Institute -132 *excluding temporary students*
- Research staff - 89
 - Professors, Dr. Habil.- 6
 - Senior researchers & Researchers (Ph.D) - 38
 - Research assistants - 21
 - Doctoral students - 14
 - Technicians – 10
- Administrative staff – 7
- Supporting services (*library, accounting etc.*) - 36

Organization of the Institute

6 Research Laboratories

- Lab. of Protein - DNA Interactions – *Prof. V. Šikšnys*
- Lab. of Biological DNA Modification – *Prof. S. Klimašauskas*
- Lab. of Bioinformatics – *Dr. Č. Venclovas*
- Lab. of Eukaryote Genetic Engineering – *Dr. G. Žvirblis*
- Lab. of Immunology and Cell Biology – *Dr. A. Žvirblienė*
- Lab. of Biothermodynamics and Drug Design – *Dr. D. Matulis*



Main directions of basic and applied research

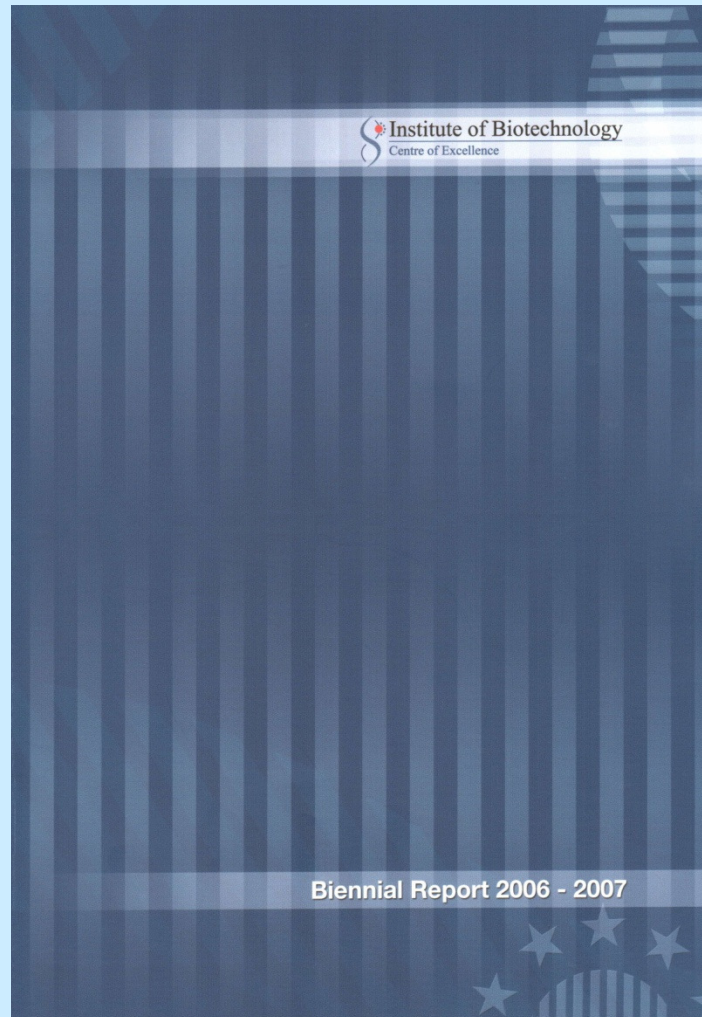
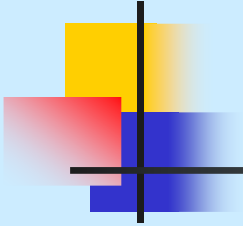
- Genetic and molecular studies of DNA restriction – modification (R-M) systems
prof. S. Klimašauskas and prof. V. Šikšnys
- Research of recombinant proteins for medical purposes
prof. K. Sasnauskas and dr. G. Žvirblis
- New directions
2005 – Design of new chemicals with therapeutical potential
dr. D. Matulis
2007 – Investigations related to industrial biotechnology programme

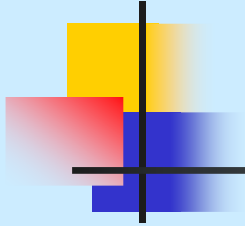


Foreign grants of IBT

- EC, Framework 5 Programme – 5 grants (1.2 mln. €)
EU “Biotechnology Centre of Excellence” project
- EC, Framework 6 Programme – 9 grants (1.16 mln. €)
- EU, Framework 7 Programme – 3 grants (0.5 mln. €)
- NIH, USA - 1 grant
- EEE - 1 grant
- Howard Hughes Medical Institute – 4 grants (1.4 mln.\$) grants
- Other grants: *The Royal Society, The Wellcome Trust, European Science Exchange Progr., Volkswagen Stiftung, Max-Planck-Institut für Biochemie, Swedish Inst. Infectious Disease Control, etc.*

IBT – for details: *Biennial Report 2006-2007*





Thank you for your attention